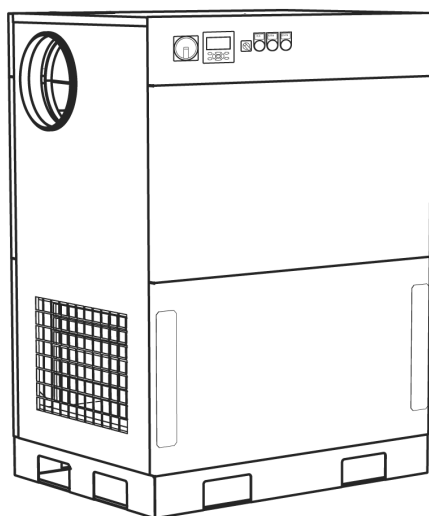


User's Manual

ML/MLT

17E-30E



Desiccant dehumidifiers ML17E-MLT30E with electric heater for reactivation

Applies to all units manufactured from
week 37, 2005

Table of Contents

| | | | |
|---|-----------|---|-----------|
| Important user information | 5 | | |
| 1 Introduction | 7 | | |
| 1.1 General | 7 | | |
| 1.2 About this manual | 7 | | |
| 1.3 Safety and caution measures | 7 | | |
| 1.4 Markings | 7 | | |
| 1.5 Supervision of operation | 8 | | |
| 1.6 Fault indications | 8 | | |
| 2 Installation | 9 | | |
| 2.1 General | 9 | | |
| 2.2 Safety | 9 | | |
| 2.3 Moving the equipment | 9 | | |
| 2.4 Packaging and Delivery Inspection | 10 | | |
| 2.5 Storing the Equipment | 10 | | |
| 2.6 Location requirements | 10 | | |
| 2.7 Ducting | 11 | | |
| 2.7.1 General recommendations | 11 | | |
| 2.7.2 Ductwork for Outdoor Air Inlet | 12 | | |
| 2.7.3 Ductwork for Wet Air Outlet | 12 | | |
| 2.8 Precautionary measures for units using LI desiccant rotor | 14 | | |
| 2.9 Electrical Connections | 14 | | |
| 2.9.1 Mains Supply | 14 | | |
| 2.10 External humidity transmitter | 14 | | |
| 2.10.1 Location requirements | 15 | | |
| 2.11 Pre-start settings | 15 | | |
| 2.11.1 Remote start | 15 | | |
| 2.11.2 Continuous process air fan operation | 15 | | |
| 2.11.3 Humidity control alternatives | 15 | | |
| 2.11.4 Reactivation temperature | 16 | | |
| 2.11.5 Control accuracy | 16 | | |
| 2.12 Pre-start checks | 16 | | |
| 2.12.1 Pre-Start Checklist | 16 | | |
| 2.13 Airflow Check and Adjustment | 17 | | |
| 2.13.1 General | 17 | | |
| 2.13.2 Process fan speed control (IP version only) | 18 | | |
| 3 Operation | 19 | | |
| 3.1 General | 19 | | |
| 3.2 Safety | 19 | | |
| 3.3 Quick stop | 19 | | |
| 3.4 Operating the unit | 20 | | |
| 3.4.1 Initial start-up, Manual mode (100%) | 20 | | |
| 3.4.2 Initial start-up, Automatic mode (AUTO) - regulating to set-point .. | 20 | | |
| | | 3.4.3 Initial start-up, Automatic mode (AUTO) - external control | 21 |
| | | 3.5 Control Panel | 22 |
| | | 4 Service and Maintenance | 24 |
| | | 4.1 Safety | 24 |
| | | 4.2 Regular service and maintenance | 24 |
| | | 4.3 Service indicator lamp | 24 |
| | | 4.3.1 Filter change needed | 24 |
| | | 4.3.2 Service requirements | 24 |
| | | 4.4 Service and Maintenance Schedule | 25 |
| | | 5 Fault Finding | 26 |
| | | 5.1 General | 26 |
| | | 5.2 Safety | 26 |
| | | 5.3 Fault Finding | 26 |
| | | 6 Dehumidifier design | 28 |
| | | 6.1 Product Description | 28 |
| | | 6.2 IP version | 28 |
| | | 6.3 Principle of operation | 28 |
| | | 6.4 Operating principles, IP version | 29 |
| | | 6.5 Dimensions and service space requirements | 30 |
| | | 6.6 Capacity Diagrams | 31 |
| | | 6.7 Technical specifications | 32 |
| | | 6.8 Unit's main components | 33 |
| | | 6.9 Noise data | 34 |
| | | 7 Control system ACD | 35 |
| | | 7.1 General | 35 |
| | | 7.2 Structure | 35 |
| | | 7.3 Working with the ACD | 35 |
| | | 7.4 Operating windows (1-6) | 36 |
| | | 7.4.1 Window 1A, Internal set-point | 36 |
| | | 7.4.2 Window 1B, External set-point | 37 |
| | | 7.4.3 Window 1C, External control | 37 |
| | | 7.4.4 Window 1D, Extra set-point | 37 |
| | | 7.4.5 Window 2, Runtime | 38 |
| | | 7.4.6 Window 3, Reactivation temperature | 38 |
| | | 7.4.7 Window 4, Motor status | 39 |
| | | 7.4.8 Window 5, Reactivation power | 39 |
| | | 7.4.9 Window 6, Alarm | 39 |
| | | 7.5 Basic settings (Windows 10-16) | 40 |
| | | 7.5.1 Window 10, Information | 40 |
| | | 7.5.2 Window 11, Continual operation of process air fan | 41 |
| | | 7.5.3 Window 12, Humidity control alternatives | 41 |

| | | | | | |
|----------|--|-----------|-------|---|----|
| 7.5.4 | Window 13, Reactivation temperature | 41 | 8.2 | Installation and operation | 44 |
| 7.5.5 | Window 14, Control accuracy | 42 | 8.2.1 | General recommendations | 44 |
| 7.5.6 | Window 15, P-gain | 42 | 8.3 | Connecting the humidity transmitter | 44 |
| 7.5.7 | Window 16, Integral time constant | 43 | 8.4 | Maintenance | 45 |
| 8 | HS21 Humidity transmitter | 44 | 8.5 | Dimensions | 45 |
| 8.1 | General | 44 | | | |

Important user information

Intended use of the equipment

Munters dehumidifiers are intended to be used for the dehumidification of air. All other uses of the equipment, or use which is contrary to the instructions given in this manual, can cause personal injury and/or machine damage.

Warranty and obligations

The warranty period is 24 months from the date the equipment left our factory, unless otherwise advised in writing. The warranty is limited to a free exchange including free freight of the faulty unit or components, which have failed as a result of faulty quality or defects in manufacture.

Munters guarantees that the unit supplied has undergone thorough testing to ensure that it meets the specifications given here. All warranty claims must include proof that the fault has occurred within the warranty period and that the unit has been used in accordance with the specifications. All claims must specify the unit type and manufacturing number. This information is stamped on the unit identification plate, see the section *Marking*.

Note!

The contents of this document can be changed without prior notice.

This publication contains information which is protected by copyright laws. No part of this publication may be reproduced, stored in a system for information retrieval, or be transmitted in any form or in any matter, without Munters' written consent.

Please send any comments regarding the contents of this publication to:

Munters Europe AB
Dehumidification Division
Technical Publications

Box 434
191 24 Sollentuna
Sweden

Tel: +46 (0)8-626 63 00

Fax: +46 (0)8-626 86 18

© Munters Europe AB 2005

Safety

In this publication hazardous activities are indicated and preceded by the common hazard symbol.



WARNING!

is used in this publication to indicate a possible danger that could lead to personal injury. An instruction is normally given, followed by a short explanation, plus the possible effects if the instruction is not followed.



CAUTION!

is used in this publication to indicate a possible danger that could lead to damage to the machine or other equipment and/or cause environmental damage. An instruction is normally given, followed by a short explanation, plus the possible environmental effect if the instruction is not followed.

NOTE!

Used to accentuate supplementary information that is required for problem-free use or optimal use of the unit.

Conformity with directives and standards

Munters dehumidifiers are designed and manufactured by an EN-ISO 9001 accredited development and manufacturing organization. The unit conforms with the specifications in the Machinery Directive 98/37/EEC, the Low Voltage Directive 73/23/EEC, as amended by Directive 93/68/EEC, and the EMC Directive 89/336/EEC as amended by Directives 92/31/EEC and 93/68/EEC. The standards applied are listed in the EC Declaration of Conformity.

This page left intentionally blank

1 Introduction

1.1 General

Munters dehumidifiers are designed to dehumidify air efficiently. Munters manufactures a wide range of dehumidifiers that are designed for different uses and applications. Please contact your nearest Munters office if you have any questions regarding the installation of your dehumidifier.

For product data, see chapter 6, *Dehumidifier design*.

1.2 About this manual

This manual is written for the user of the dehumidifier and describes the installation, operation, maintenance and basic fault finding.

The information structure of the manual is built on numbered chapters and sections. Contents on page 3 gives a quick overview. The different chapters can be used separately to serve their purpose. Figures and tables are numbered in accordance with the actual chapter, e.g. figure 1–3 is picture number 3 and is found in chapter 1.

1.3 Safety and caution measures

The contents of this manual include suggested best working practices and procedures. These are provided for guidance only. They are not intended to replace personal responsibility and/or local safety regulations.

The dehumidifiers in the ML range are designed to meet the safety requirements, directives and standards listed in the EC Declaration of Conformity.

We recommend that the user informs him/herself about the use of safety symbols in this manual by reading the section “Important User Information” on the previous page. Safety information in this manual is contained at the beginning of each of its chapters.

1.4 Markings

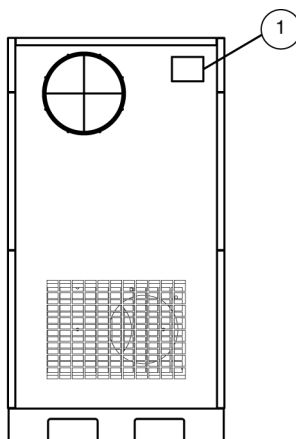


Figure 1.1 Location of the unit identification plate

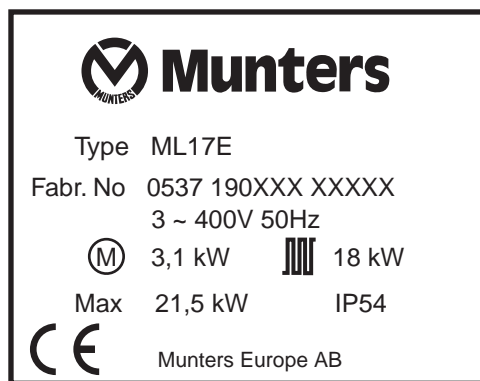


Figure 1.2 Main identification label, example

Explanation of "Fabr. no" on the identification plate

05 = year of manufacture, 37 = week of manufacture, 190XXX XXXXX = article number

1.5 Supervision of operation

The dehumidifier is controlled and monitored using the control panel located on the front of the unit, see section 3.5, *Control Panel*.

1.6 Fault indications

The red lamp on the control panel lights to indicate the occurrence of a fault. Window 6 of the control system, see section 7.4.9, *Window 6, Alarm*, shows which function caused the fault indication.

2 Installation

2.1 General

The ML Dehumidifier is intended for indoor installation.

The unit is inspected and checked prior to leaving the factory to guarantee consistent quality and maximum reliability.

If the unit is to be put into storage, prior to installation see section 2.5, *Storing the Equipment*.

2.2 Safety

**WARNING!**

Ensure that the mains power is disconnected from the dehumidifier prior to changing the orientation of the process and dry air connections.

**WARNING!**

Low voltage is permanently connected to the inlet main power switch of the unit. In the event of adjustment, maintenance or repair, the unit front covers may only be removed by qualified personnel.

**CAUTION!**

The wet air ducting must always be insulated if there is a risk of freezing. The wet air leaving the dehumidifier will, due to high moisture content, condense on the inside duct walls.

**CAUTION!**

The main power switch must only be used in an emergency to stop the unit. Since the reactivation fan will also stop, considerable heat can develop in the reactivation heater causing its high temperature protector to trip. Components close to the heat could be damaged.

**CAUTION!**

The dehumidifier has been designed to operate at specific process airflows (corresponding to the fan sizes installed) and must not be directly connected to air-conditioning systems.

2.3 Moving the equipment

The dehumidifier is delivered on a pallet and must be handled carefully. All panel doors on the unit must be closed during transport. Provided that the dehumidifier is still secured to its delivery pallet, it can be moved using a fork-lift truck.

Weight of the dehumidifier can be found in section 6.5, *Dimensions and service space requirements*.

2.4 Packaging and Delivery Inspection.

- 1 Check the delivery against the packing list, consignment note, or other delivery documents and check that everything is included and nothing is damaged.
- 2 Contact Munters immediately if the delivery is not complete in order to avoid installation delays.
- 3 If the unit is to be put into storage, prior to installation, see section 2.5, *Storing the Equipment*.
- 4 Remove all packing materials from the unit and check carefully to make sure that no damage has occurred during transport.
- 5 Any visible damage must be reported in writing to Munters prior to the start of installation.

2.5 Storing the Equipment

The following is important if the dehumidifier is to be stored prior to installation:

- Place the dehumidifier on a horizontal surface.
- Do not remove the dehumidifier's packaging.
- Protect the dehumidifier from physical damage.
- Store the dehumidifier under cover and protect from dust, frost, rain and aggressive contaminants.

2.6 Location requirements

The dehumidifier is only intended for indoor installation.

Avoid installing the dehumidifier in a damp environment where there is a risk of water entering the unit or in a very dusty environment. If in doubt, seek advice from Munters.

It is important that the intended installation site meets the location and space requirements for the equipment in order to achieve the best possible performance and trouble-free operation.

For the unit and service dimensions, see section 6.5, *Dimensions and service space requirements*.

NOTE!

It is important, both for maintenance and for service, that the minimum dimensions for service access are complied with.

2.7 Ducting

2.7.1 General recommendations

The connections for process and reactivation air are designed in accordance with the recommendations in ISO 7807. The rectangular duct connections contain tapped inserts for M8 screws.

NOTE!

The dehumidifier has been designed to operate at specific process airflows (corresponding to the fan sizes installed) and must not be directly connected to air-conditioning systems.

NOTE!

The IP version, see section 6.2, IP version, does not have a process air filter. Process air must therefore be connected to cold/pre-cooled and filtered air via a duct.

When installing ductwork between the dehumidifier and the inlet and outlet connections, the following recommendations should be observed:

- The length of ductwork should be kept as short as possible to minimise static air pressure losses.
- To maintain performance, all rigid process or reactivation air ductwork joints must be air and vapour tight.
- The process air ductwork should be insulated to prevent condensation from developing on the outside of the duct whenever the temperature of the air within the duct falls below the dewpoint of the ambient air through which the ductwork is routed.
- The ducting must always be insulated when there is a risk of freezing.
- The wet air leaving the dehumidifier will easily cause condensation on the inside of the duct walls due to the high moisture content. This must be avoided by insulating the ducts.
- Horizontal duct-runs should be installed sloping downwards (away from the dehumidifier) to allow for condensate drainage. On the wet air outlet ducting, suitable condensate drains should be installed at low points in the ductwork. See figure 2.2, *Wet air outlet design*.
- Ensure that access for operation and servicing is not restricted when designing and installing ducting. For more information, refer to section 6.5, *Dimensions and service space requirements*.
- To reduce noise and/or vibration being transmitted along rigid ductwork, good quality, airtight flexible connections should be fitted.
- Ducts mounted directly onto the dehumidifier should be adequately supported to minimise the load and stress due to the weight and movement of the ducting.
- Dampers for balancing the airflows must be installed in the dry air outlet and reactivation air inlet ducts. The correct airflows are essential for

maintaining the operating efficiency of the unit. To correct the airflow, see section 2.13, *Airflow Check and Adjustment*.

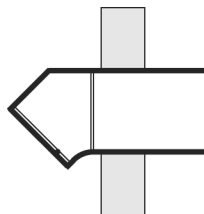
- For the IP version, see section 6.2, *IP version* process air pressure and flow are adjusted using the frequency converter of the process air fan. In this case, there is no need for a damper in the dry air duct.
- The total resistance in the process and reactivation ductwork must not exceed the performance rating of the fans fitted in the dehumidifier. For details of minimum available static pressure, see section 6.7, *Technical specifications*.

2.7.2 Ductwork for Outdoor Air Inlet

When bringing outside ambient air into the dehumidifier, the opening to the inlet duct should be located sufficiently high above ground level to prevent the pick-up of dust and debris. The ducting should be designed to prevent rain and snow from being drawn into the dehumidifier. The air inlet must be located away from possible contaminant such as engine exhaust gases, steam and harmful vapours.

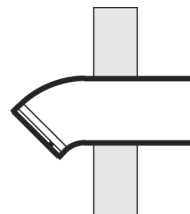
To prevent the wet (outlet) air humidifying the reactivation (inlet) air, the air inlet for reactivation must be located at least 2 m from the air outlet for wet air. See figure 2.1, *Outdoor air inlet design*.

Rectangular duct



Wire netting, mesh width approx. 10 mm

Round duct



Wire netting, mesh width approx. 10 mm

Figure 2.1 Outdoor air inlet design

2.7.3 Ductwork for Wet Air Outlet

Wet air ducting should be manufactured in corrosion-resistant material (e.g. stainless steel, aluminium or plastic) and should be capable of withstanding temperatures of up to 100°C.

NOTE!

The wet air ducting must always be insulated if there is a risk of freezing. The wet air leaving the dehumidifier will easily cause condensation on the inside of the duct walls due to the high moisture content.

Horizontal duct-runs must therefore be installed sloping downwards (away from the dehumidifier) to allow for condensate drainage. The slope should be a minimum of 2 cm per meter of duct. In addition, 5 mm drain holes

should be drilled at the lowest points in the ducting to prevent water accumulating in the duct, see figure 2.2, *Wet air outlet design*.

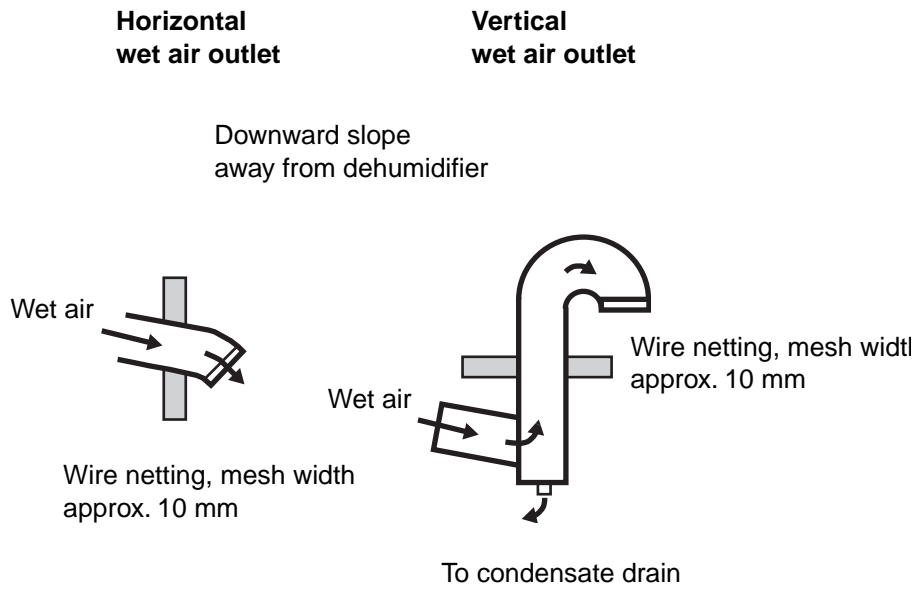


Figure 2.2 *Wet air outlet design*

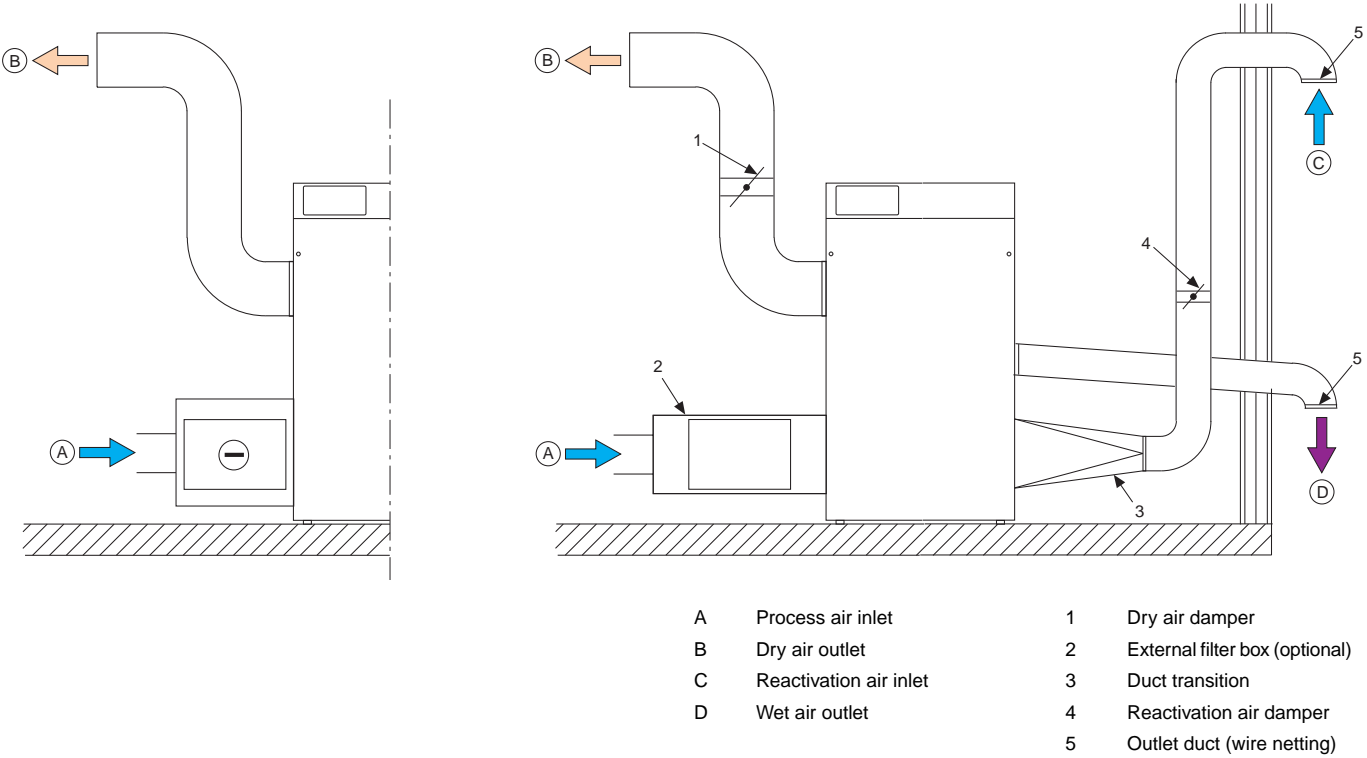


Figure 2.3 *Ducts required for installation. The illustration on the left depicts the IP version with pre-cooling.*

2.8 Precautionary measures for units using LI desiccant rotor

The dehumidifier comes standard with Munters' high performance rotor HPS (High Performance Silicia gel).

If the dehumidifier is delivered with LI rotor (lithium chloride) it is vital to prevent the desiccant rotor from becoming too greatly loaded with moisture when the dehumidifier is switched off. Make sure that no air passing through the rotor has a relative humidity greater than 80% !

We recommend installation of an adjustment damper in the dehumidifier's process and reactivation air inlet. This prevents air with very high relative humidity from inadvertently being drawn through the rotor and into the room.

This is particularly important when the process air is drawn from outdoors, or the system has been fitted with a pre-cooler.

2.9 Electrical Connections

2.9.1 Mains Supply

The unit is designed for 3-phase AC operation. Each unit is supplied complete with all the internal wiring installed and configured in accordance with the specified voltage and frequency on the identification plate.

NOTE!

The supply voltage must not differ by more than 10% from the specified operating voltage. The unit must be correctly earthed.

The mains power supply is connected directly to the main power switch in the unit. The supply cable and main fuses must be dimensioned to suit the unit being installed.

For connection details, refer to the *identification plate* and *Electrical Circuit Diagram* or refer to section 6.7, *Technical specifications*.

2.10 External humidity transmitter

The dehumidifier is supplied as standard with a humidity transmitter of type HS21 suitable for wall of duct mounting. This is mounted externally and connected to a terminal block, see the electrical circuit diagram supplied with the unit. The humidity transmitter controls the dehumidifier when the operational mode switch is in the **AUTO** position, i.e. automatic operation, and also indicates the current Relative Humidity, see section 2.11, *Pre-start settings*.

To ensure functionality, the humidity transmitter should be connected using the cable supplied. If a longer cable is required, use of the same cable type is recommended. If the transmitter cable is longer than approx. 100 metres, there may be voltage drops that could affect the function of the humidity transmitter.

2.10.1 Location requirements

The humidity transmitter should be mounted 1–1.5 m above the floor and positioned so that it is not exposed directly to dry air from the unit or incoming moist air from opening and closing doors. It must not be placed close to a heat source or so that it is exposed to direct sunlight.

2.11 Pre-start settings

Before starting the dehumidifier for the first time, a number of operating parameters must be set via the ACD control system; see section 7.5, *Basic settings (Windows 10-16)*. Some features require connection to external equipment. For wiring details, refer to the *wiring diagrams* supplied with this unit.

2.11.1 Remote start

The unit can be started and stopped externally with a switch connected between terminal blocks 307 and 308. To do so, the link that is mounted as standard must be removed.

2.11.2 Continuous process air fan operation

The default setting is that the process fan starts automatically only when dehumidification is needed. However, continuous process airflow may be desirable even when there is no demand for dehumidification.

The process fan can be set to operate continuously, see section 7.5.2, *Window 11, Continual operation of process air fan*.

2.11.3 Humidity control alternatives

There are three different ways of controlling the dehumidifier when in the automatic operational mode, see section 7.5.3, *Window 12, Humidity control alternatives*.

- 1 The dehumidifier runs to an internally adjustable set-point which is programmed via control system window 1A.
- 2 The dehumidifier is regulated to an externally adjustable set-point. See display 1B. The external set-point comprises an analogue signal, 0-10 V, between terminal blocks 304 and 306. 3.0 volts, for example, is set-point 30% RH.
- 3 The dehumidifier's heater is controlled from an external input signal, 0-10 V, see display 1C. The external input signal at input 18 (terminal block 306) controls the heater power regardless of the actual humidity load. 3.0 volt, for example, means that the unit is being run at approximately 30 % heating capacity

If you can accept a different relative humidity level during certain times, then it is possible, regardless of which of these three control alternatives is selected, to control the dehumidifier against an additional temporary internally adjustable set value, designated set value 2, see section 7.4.4, *Window 1D, Extra set-point*. Set value 2 is activated using a closing contact,

which might be a timer, for example, between terminal blocks 309 and 310.

2.11.4 Reactivation temperature

It is possible to set a maximum reactivation temperature. It is pre-set to 130°C, see section 7.5.4, *Window 13, Reactivation temperature*.

2.11.5 Control accuracy

It is also possible to set the maximum difference between switching on and off, so-called hysteresis, in display 14. The pre-set value is 3 %. For more information, see section 7.5.5, *Window 14, Control accuracy*.

2.12 Pre-start checks



WARNING!

The mains power supply is permanently connected to the main power switch in the unit. Adjustments, maintenance and repair work may only be carried out by qualified personnel.

2.12.1 Pre-Start Checklist

The following checks are to be carried out before the dehumidifier is started for the first time.

- 1 Ensure that the main power switch on the control panel is in the position 0.
- 2 Check the air intake filters for damage and proper fixation and also check that all areas inside the unit are clean.
- 3 Visually inspect all ducting and duct connections to make sure that all connections have been correctly installed and that there are no signs of damage to the system. Also check that all ducts are free from obstacles blocking the air passage.
- 4 Remove the lower front panel and check that none of the circuit breakers on the control panel has tripped. For further details, refer to the wiring diagrams provided with the unit.
- 5 Check that the incoming power supply voltage is correct and that the cables are correctly connected.
- 6 Check that the humidity transmitter/sensor have been correctly positioned in the room and have been properly connected to the unit, see section 2.10, *External humidity transmitter*.
- 7 Set the process and reactivation airflow dampers to the fully open position. For the IP version, the process air fan is run at high speed with the help of the frequency converter, see section 2.13.2, *Process fan speed control (IP version only)*

2.13 Airflow Check and Adjustment

2.13.1 General

To obtain the design performance, the dry air and reactivation airflow dampers must be correctly adjusted in accordance with the rated airflow, see section 6.7, *Technical specifications*.

If necessary, please contact Munters to obtain help to order the installation and adjustment of the dehumidifier. *The addresses and telephone numbers to Munters can be found on the back of this manual.*



CAUTION!

Failure to correctly adjust the process and reactivation airflows could cause the unit to malfunction.

- 1 The direction of rotation of the rotor must be checked after connection to the power supply. Open the middle front panel. Start the dehumidifier and check that the rotor is rotating clockwise, i.e. in the same direction as the arrow.
- 2 By adjusting the dampers installed in the dry air outlet and reactivation air inlet ducts, the process and reactivation airflows can be changed to the required setting.
- 3 Start the dehumidifier for approximately eight minutes to allow the reactivation heater to reach its normal operating temperature. See chapter 3, *Operation*
- 4 Check that the temperature difference between the reactivation air (display 3) and the input reactivation temperature is approximately 95°C (tolerance $\pm 5^\circ\text{C}$). If the temperature differential is outside the tolerance limit of 5 %, adjust the reactivation air damper in small steps (allowing the temperature display to stabilize after each adjustment) until the reactivation temperature reading is within the specified tolerances.

EXAMPLE

Inlet air temperature 15°C

Reactivation air temperature 110°C

Temperature increase 95°C

2.13.2 Process fan speed control (IP version only)

The process air fan is controlled via a frequency converter that makes it possible to adjust air pressure and flow. This is located behind the lower front panel.



For information on use and setting, see the separate frequency converter manual.

3 Operation

3.1 General

Dehumidifiers ML17 - MLT30 are equipped with a control panel containing main power switch, mode switch, display and indicator lamps.

The operating switch on the control panel has two operating positions:

100 % (Full power position)

The dehumidifiers fans, rotor and reactivation heater operate continuously at full capacity.

AUTO (Automatic position)

The dehumidifier fans, rotor and reactivation heater operate when the relative humidity *exceeds* the desired value (the set-point). If remote start is connected, the switch must be set to on; see section 2.11.1, *Remote start*. If continual process air operation is selected in the control system, see section 7.5.2, *Window 11, Continual operation of process air fan*, the process air fan continues to run even after the unit has stopped dehumidifying.

If the dehumidifier is regulated via an external input signal, see section 7.4.3, *Window 1C, External control*, the fans and drive motor start when the "remote start" switch is closed, regardless of the existing relative humidity. The reactivation heater is regulated via the input signal.

In the case of a power cut, the dehumidifier will restart automatically when the power supply is restored.

3.2 Safety



CAUTION!

To prevent damage to the fans, the unit must not be run for longer than a few minutes prior to setting-up the process and reactivation airflows. For more information, see section 2.13, Airflow Check and Adjustment.



CAUTION!

Failure to correctly adjust the process and reactivation airflows could cause the unit to malfunction.

3.3 Quick stop



The mode switch is used to start and stop the unit in normal operation. In case of an emergency, use the main power switch on the dehumidifier, see figure 3.5, *Control Panel*.

CAUTION!

The main power switch should only be used to stop the dehumidifier in an emergency. Since the reactivation fan will also stop, considerable heat can build up in the reactivation heater, causing its high temperature protector to trip, which can cause damage to components close to the heater.

3.4 Operating the unit

3.4.1 Initial start-up, Manual mode (100%)

- 1 Move the main power switch to the "1" position and check that the ACD display is switched on.
- 2 The three lamps should flash twice as a check on the lamp function.
- 3 Move the operating switch to the **100 %** position. Check that:
 - The white lamp illuminates to indicate that the unit is dehumidifying.
 - The process and reactivation air fans have started, see section 7.4.7, *Window 4, Motor status*.
 - The drive motor is operating, see section 7.4.7, *Window 4, Motor status*.
- 4 Allow the unit to operate for approximately 8 minutes to ensure that the operating conditions have stabilised. Check that the temperature of the reactivation heater is rising, see section 7.5.4, *Window 13, Reactivation temperature*.
- 5 Move the operating switch on the control panel to the "0" position.
- 6 In order to dissipate any residual heat, the reactivation air fan and the drive motor will continue to run after the unit has been switched off until the reactivation temperature has fallen below approx. 50°C.
- 7 Check that the reactivation air fan and the drive motor stop once the reactivation temperature has fallen below approx. 50°C. A few minutes delay is quite normal.

3.4.2 Initial start-up, Automatic mode (AUTO) - regulating to set-point

In order to operate the unit in automatic mode to a desired set-point, a humidity transmitter must be connected. If the system is equipped with "remote start", this switch must be closed.

The following applies regardless of whether the unit is regulated by a set-point set via the unit display, see section 7.4.1, *Window 1A, Internal set-point* (display 1A), external, see section 7.4.2, *Window 1B, External set-point* (display 1B) or via an extra set-point, "nighttime reduction", see section 7.4.4, *Window 1D, Extra set-point* (display 1D).

- 1 Move the main power switch to the "1" position and check that the power connection indicator is displayed. This consists of the ACD display being switched on and the small green light on the display unit flashing.
- 2 Adjust the set value for the minimum possible relative humidity (%RH).
- 3 Move the operating switch to the **AUTO** position. Check that:
 - The white lamp illuminates to indicate that the unit is dehumidifying.

- The fans and drive motor have started, see section 7.4.7, *Window 4, Motor status*
 - The heater is running, see section 7.4.8, *Window 5, Reactivation power*
 - Reactivation temperature rises, see section 7.4.6, *Window 3, Reactivation temperature*
- 4 The set-point for relative humidity gradually rises and check that the unit switches off when the set-point corresponds with the actual relative humidity.
 - 5 Then reduce the set value one percent at a time and make a note of the set value at which the unit restarts. The difference between the real RH value and the current set value is the regulation accuracy, hysteresis, for which the humidity control is set. This value can be changed on display 11.
 - 6 Move the operating switch on the control panel to the "0" position.
 - 7 In order for the reactivation heater to cool down, the reactivation air fan and the drive motor continue to operate after the unit has shut down, until the temperature of the heater falls below 50°C.
 - 8 Check that the reactivation air fan and the drive motor stop when the reactivation temperature drops below approx. 50°C .
 - 9 Adjust the desired set value of RH.

3.4.3 Initial start-up, Automatic mode (AUTO) - external control

When the unit is controlled via an external input signal (0 - 10 V), the following measures should be taken before first start-up. .

- 1 Operate the main power switch to the "1" position and check the indication for "power supply connected". The ACD display should be illuminated.
- 2 Set the external input signal to approx. 10 V.
- 3 Operate the Mode switch on the control panel to the **AUTO** position. Check that:
 - The white lamp illuminates to indicate that the unit is dehumidifying.
 - The fans and drive motor have started, see section 7.4.7, *Window 4, Motor status*
 - Heater output is connected, see section 7.4.8, *Window 5, Reactivation power*
 - Reactivation temperature rises, see section 7.4.6, *Window 3, Reactivation temperature*

- 4 Reduce input signal voltage to approx. 6 V. Check that heater output is approx. 65%.
- 5 Reduce input signal voltage to approx. 3 V. Check that heater output is approx. 35 %.
- 6 Reduce the voltage to 0 V and check that the heater power is completely switched off.
- 7 Move the mode switch on the control panel to position "0". Check that the dehumidifier shuts down once reactivation temperature has dropped below 50 °C. Switch off "remote start" if it is engaged.

3.5 Control Panel

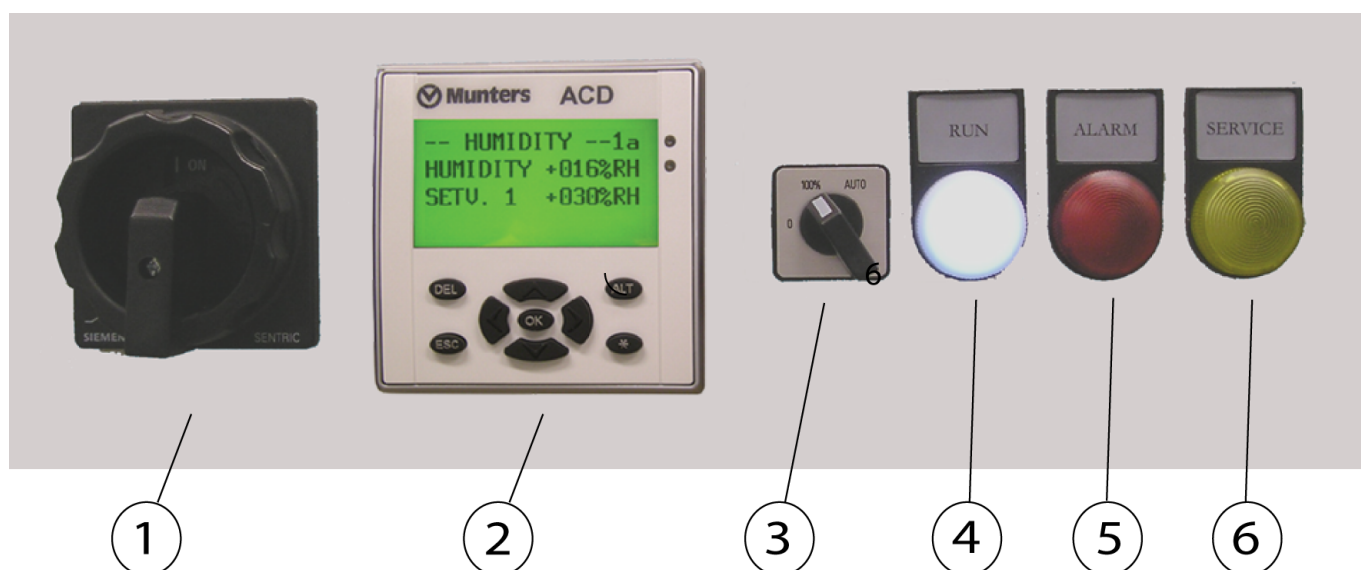


Figure 3.1 Control Panel

| Item. | Switch/Indicator | Function |
|-------|--------------------|---|
| 1 | Main Power Switch | When the main power switch is in the "0" position, the unit is not powered beyond the switch. When the main power switch is in the "1" position, the dehumidifier can be started. |
| 2 | Control system ACD | See chapter 7 for information about the functions of the control system. |
| 3 | Mode switch | With the mode switch in the "100%" position, the dehumidifier will operate in manual mode. In this position, the unit will operate continuously (full capacity). There may be a brief delay before the unit starts. When the mode switch is in the "AUTO" position, the dehumidifier runs automatically and is controlled towards an internally adjustable relative humidity set value or via an external input signal. When the mode switch is in the "0" position, the dehumidifier is switched off but may continue to run until it has cooled down. |
| 4 | White lamp (RUN) | Illuminates when the unit dehumidifies. |
| 5 | Red lamp (ALARM) | Illuminates with a steady glow when an alarm has triggered. Check window no. 6 to see which alarm has triggered. |

| Item. | Switch/Indicator | Function |
|-------|-----------------------|--|
| 6 | Yellow lamp (SERVICE) | Illuminates when a filter change is required, see section 7.4.9, <i>Window 6, Alarm</i> or when the dehumidifier has reached the number of operating hours at which maintenance should be carried out, see section 7.4.5, <i>Window 2, Runtime</i> . |

Table 3.1 Function of the Control Panel

4 Service and Maintenance

4.1 Safety

**WARNING!**

Adjustments, maintenance and repair work may only be carried out by qualified personnel.

4.2 Regular service and maintenance

Munters dehumidifiers are designed for long-term, continual usage with a high degree of reliability. As with all machinery, regular service and maintenance is required to keep the dehumidifier in optimal condition so that it works most efficiently.

Service and maintenance interval lengths are primarily determined by operating conditions and the environment in which the unit is installed. For example, if the process air contains a lot of dust, preventative maintenance should be carried out at shorter intervals. The same also applies if the dehumidifier works intensively.

Below is an example of an ordinary service and maintenance program, see section 4.4, *Service and Maintenance Schedule*.

Besides commissioning the unit, four different service programs (A-D) should be implemented at different time intervals.

Alternatively, the Service Department at Munters can propose a service program adapted to suit local conditions, depending on how the unit is working and on the type of environment.

The ML dehumidifier has a service reminder indicator in the control system, see below. When installing and commissioning, an estimate should be made of the number of operating hours to the next service. This agreed value is programmed in by Munters' personnel.

4.3 Service indicator lamp

4.3.1 Filter change needed

The yellow service lamp indicates that a filter change or a general service is needed. When the yellow lamp lights, follow these steps:

Choose window 6 in the control system to find out why the service lamp is lit. If "Service 0001" is displayed, the reactivation filter must be changed. If "Service 0002" is displayed, the process air filter must be changed. Open the filter cover and change the filter.

4.3.2 Service requirements

If neither of the indicators mentioned above are shown in window 6, go to window 2. If window 2 shows "Service 0000" or a negative value, the dehumidifier has reached the number of operating hours where a general service is recommended. Contact Munters service department.

Window 2 shows the number of operating hours until the next service is needed. A minus sign before the number of hours indicates that the service should already have been carried out.

Below is an example of an ordinary service and maintenance program.

4.4 Service and Maintenance Schedule

| Service work | Service level | Start | A | B | A | B | A | C | A | B | A | B | A | D |
|---|-------------------------|-------|------|------|-------|-------|-------|-------|-------|-------|-------|-------|-------|-------|
| | Operating time in hours | 0 | 4000 | 8000 | 12000 | 16000 | 20000 | 24000 | 28000 | 32000 | 36000 | 40000 | 44000 | 48000 |
| | Calendar time in months | 0 | 6 | 12 | 18 | 24 | 30 | 36 | 42 | 48 | 54 | 60 | 66 | 72 |
| Inspection, replace filter if necessary, function controls | | X | X | X | X | X | X | X | X | X | X | X | X | X |
| Preventive inspection incl. safety check | | X | | X | | X | | X | | X | | X | | X |
| Measuring capacity, rotor inspection | | X | | X | | X | | X | | X | | X | | X |
| Replacing over-temperature protection | | | | | | | | X | | | | | | X |
| Inspect drive belt and backing rollers and replace if necessary | | | | | | X | | | | | | | | X |
| Drive motor replacement | | | | | | | | X | | | | | | X |
| Examining fans, impellers, motor, bearings | | | | | | | | X | | | | | | X |
| Examining electrical and control systems, function check | | X | | X | | X | | X | | X | | X | | X |
| Calibrating the humidity control equipment and the sensors | | | | X | | X | | X | | X | | X | | X |
| Calibrating the temperature control equipment and the sensors | | | | X | | X | | X | | X | | X | | X |
| Inspecting rotor housing, replacing rotor gaskets if necessary | | | | | | | | | | | | | | X |

Table 4.1 Service and maintenance schedule

5 Fault Finding

5.1 General

The purpose of this chapter is to provide guidance in basic fault finding and provide instructions for corrective actions to remedy any faults. Wiring diagrams can be useful when fault finding.

5.2 Safety



WARNING!

Adjustments, maintenance and repairs must only be carried out by qualified personnel.

5.3 Fault Finding

The red alarm lamp together with the ACD windows constitute the primary source of information for fault finding when an alarm has been triggered and the unit has stopped.

An alarm indicator is reset automatically once the problem that triggered the alarm has been rectified.

Go through the fault localisation list below before contacting Munters. The list provides help in identifying types of faults that are easy to remedy without the assistance of specially trained personnel.

Always switch off the main power switch before removing the unit's panels.

| Fault Symptom | Indicators | Possible cause | Corrective Action |
|---|---------------------------|--|--|
| Unit has stopped | Lamps and display all off | <p>Power supply failure.</p> <p>Main power switch (No.1) is in the "0" position.</p> <p>Fuses FU27 and FU28 have tripped.</p> <p>Circuit Breaker QM25 tripped due to a wiring fault.</p> | <p>Check power supply to the unit.</p> <p>Operate the main power switch to the "1" position and check that the display is active and indicates the latest settings, and that the three lamps are flashing as they do during lamp test.</p> <p>Investigate the cause of the fault and rectify. Reset fuses.</p> <p>Investigate the cause of the fault and rectify. Reset QM25. If the fault re-occurs, contact Munters Product Service.</p> |
| The unit is in AUTO mode and has stopped | The display is active. | <p>There is no need for dehumidification</p> <p>If remote start is selected, it has been switched off</p> <p>The mode selector has been set to the AUTO automatic position by mistake, although no humidistat has been connected.</p> <p>Humidistat fault (AUTO mode).</p> | <p>Switch on the remote start switch</p> <p>Set the mode selector switch to the 100 % position and check that the unit starts.</p> <p>Set the mode switch to AUTO mode and check the humidistat by seeing whether the dehumidifier starts when the humidistat set-value is reduced to less than the value for the actual relative humidity (RH). Reset the humidistat set-value after the check. If necessary, replace the humidistat.</p> |

| Fault Symptom | Indicators | Possible cause | Corrective Action |
|---|--|--|--|
| Unit has stopped | The red lamp is on and A-alarm no. 1 is shown on display 6. | The high temperature cut-out BT33 has tripped, either due to an obstruction in the reactivation airflow or because the reactivation airflow has been set too low. | Leave the unit to cool down. Check that the air inlet, outlet ducts and filters are free from obstructions and are not clogged with dirt. Check and adjust the reactivation airflow, see section 2.13, <i>Airflow Check and Adjustment</i> . |
| Unit has stopped | The red lamp is on and display 6 is showing: A-alarm no. 2 A-alarm no. 3 A-alarm no. 4 A-alarm no. 5 A-alarm no. 6 A-alarm no. 8 A-alarm no. 9-11 | Rotor has stopped. Reactivation fan is not working - the circuit breaker has tripped - some other cause Process air fan is not working - the circuit breaker has tripped - some other cause Over-temperature in drive motor Reactivation heater is not working Frequency converter error (IP version only) Reactivation heater is faulty | Investigate cause of alarm and rectify. General: Set the mode switch to "0" to reset the alarm once the fault has been corrected. If the fault re-occurs, contact Munters Product Service. Check that the drive belt has not snapped Reset QM21. Contact Munters Product Service. Reset QM23. Contact Munters Product Service. Leave the motor to cool down and rectify the cause Reset QM12 - 16. Check the frequency converter manual for type of error and remedy Contact Munters Product Service. |
| Unit in operation. | The yellow lamp lights and display 6 shows Service no. 1. Service no. 2 | - Reactivation filter clogged - Process air filter clogged | Replace filter Replace filter |
| Loss of performance: The dehumidifier is in operation but is not controlling the humidity. | | According to display no. 3, the temperature rise across the reactivation unit is too low. Reactivation and process airflows do not correspond to the rated airflows. The humidistat is not working properly | Check the function of the reactivation heater. Check and adjust the reactivation and process, see section 2.13, <i>Airflow Check and Adjustment</i> . Check the function of the humidistat and that it is connected in accordance with the manufacturer's recommendations, see section 8, <i>HS21 Humidity transmitter</i> . |

Table 5.1 Fault Finding

6 Dehumidifier design

6.1 Product Description

The ML Series desiccant dehumidifiers are designed to efficiently dehumidify the air in low moisture applications. They are equipped with an encapsulated rotor unit. The rotor casing is constructed of durable thermoset plastic and contains isolated sections that provide a precise balance for the dehumidification, reactivation and heat recovery airflows. Its ruggedly formed metal frame and access panels are manufactured of stainless steel.

The electrical control system conforms to EN60204 (IEC204) standards. The electrical components are rail-mounted and are constructed of halogen-free plastic. The electrical system has been designed for up to 500 V and 60°C. The ML series dehumidifiers conform to both harmonised European standards and to CE marking specifications.

6.2 IP version

When cold process air is to be dehumidified, often in conjunction with a pre-cooler, condensate will readily form on the inlet side of the dehumidifier. ML-series dehumidifiers can therefore be supplied in an IP version in which the process air fan is encased in a specially insulated box so as to hinder the formation of condensation.

6.3 Principle of operation

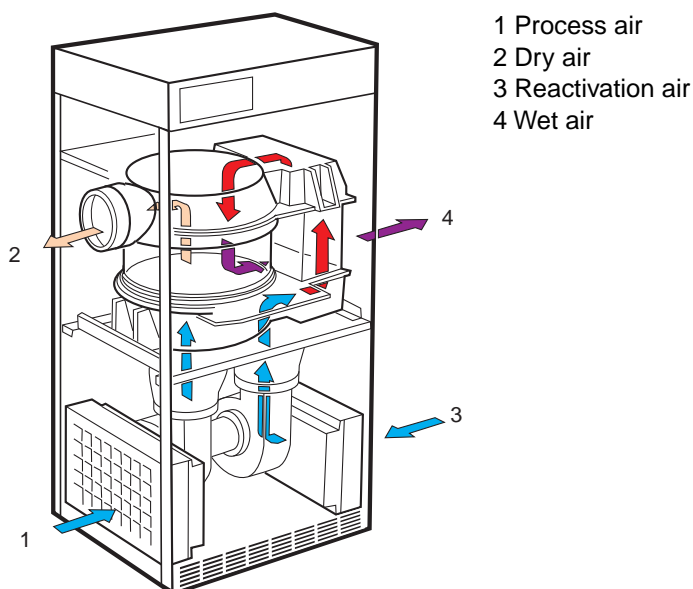


Figure 6.1 Operating principles

The desiccant rotor structure comprises a large number of narrow and parallel air channels, processed to a composite material that is highly effective in attracting and retaining water vapour.

The rotor is exposed in sectors to different airflows. The airflow that is to be dehumidified is called **process air** (1) and passes through the largest sector of the rotor. The moisture in the process air is deposited into the rotor structure and the process air will then leave the rotor as **dry air** (2). While the rotor rotates slowly the incoming process air always meets a dry rotor structure, thus creating a continuous dehumidification process.

The airflow that is used to reactivate (dry) the rotor structure is called **reactivation air** (3) and is first heated. Passing through the smallest sector of the rotor, in the opposite direction to the process airflow, the reactivation air removes the deposited moisture and leaves the rotor as **wet air** (4) – warm, moist air.

6.4 Operating principles, IP version

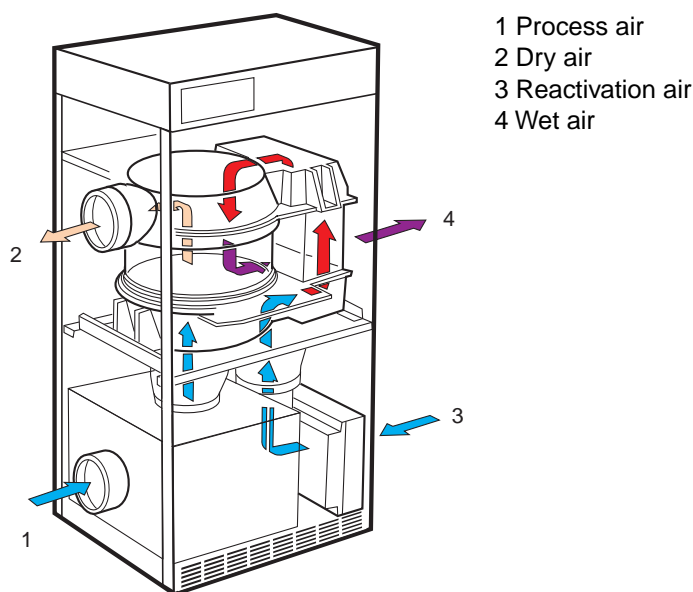


Figure 6.2 Operating principles for IP version

The operating principles are the same in the IP version, but the process air inlet is designed to receive cold, wet air.

6.5 Dimensions and service space requirements

Scaled and dimensioned AutoCAD drawings are available in Munters’ DryCAD program (can be ordered from the nearest Munters office).

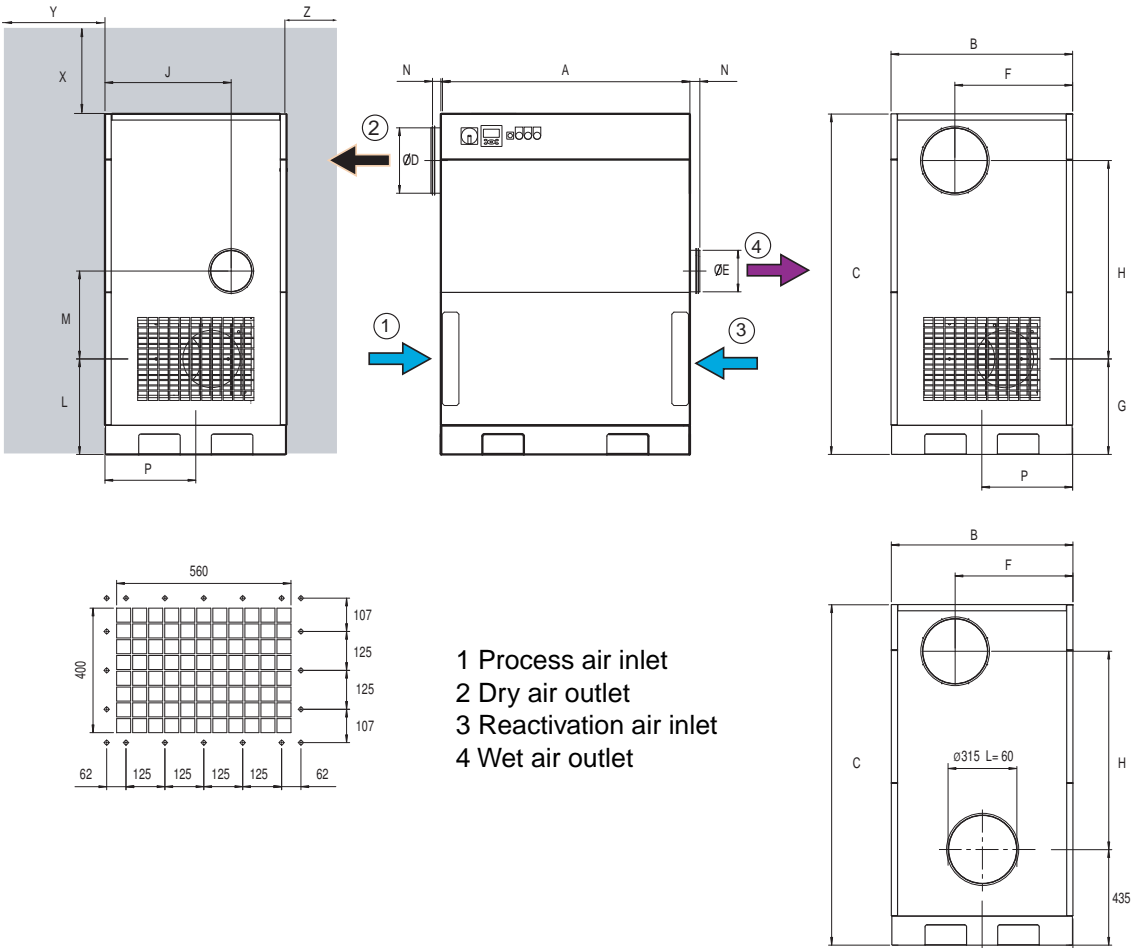


Figure 6.3 Dimensions and space requirements (IP version on bottom right)

| Model | Dimensions (in mm) | | | | | | | | | | | | | | | | Weight (kg) |
|-------|--------------------|-----|------|-----|-----|-----|-----|-----|-----|-----|-----|----|-----|------------------|------------------|------------------|-------------|
| | A | B | C | ØD | ØE | F | G | H | J | L | M | N | P | X ⁽¹⁾ | Y ⁽¹⁾ | Z ⁽¹⁾ | |
| ML17 | 1200 | 875 | 1640 | 315 | 200 | 568 | 460 | 956 | 608 | 460 | 424 | 48 | 438 | 200 | 950 | 700 | 280 |
| ML23 | 1200 | 875 | 1640 | 315 | 200 | 568 | 460 | 956 | 608 | 460 | 424 | 48 | 438 | 200 | 950 | 700 | 285 |
| MLT30 | 1200 | 875 | 1640 | 315 | 200 | 568 | 460 | 756 | 608 | 460 | 424 | 48 | 438 | 200 | 950 | 700 | 270 |

(1) Space for service.

Table 6.1 Dimensions and service space requirements

6.6 Capacity Diagrams

Approximate capacity in kg/hr. Please contact your nearest Munters office or refer to Munters' DryCad program for more detailed information.

NOTE! The below figures are based on a nominal (1/1) airflow.

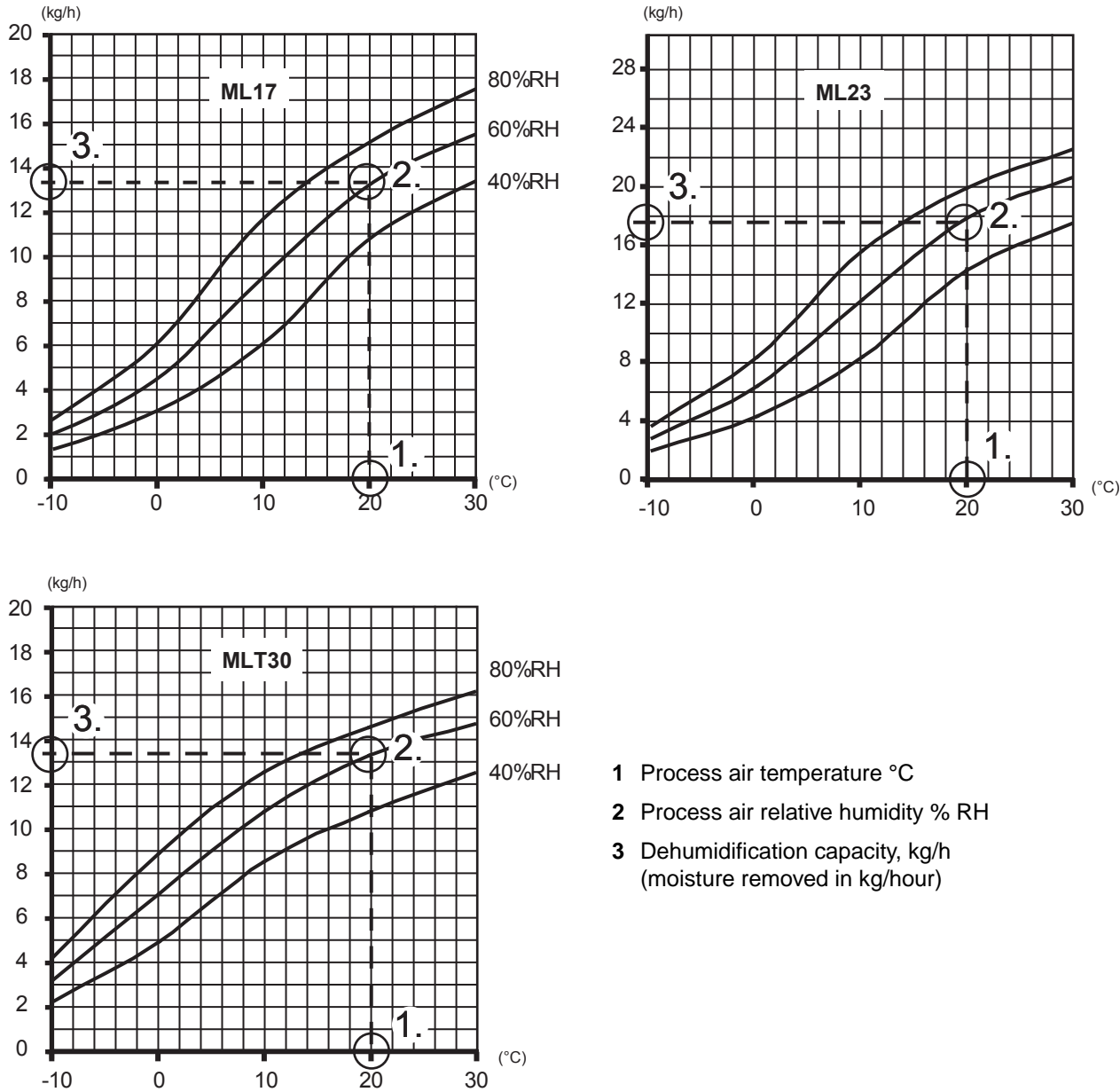


Figure 6.4 Capacity Diagrams

6.7 Technical specifications

The following data is applicable to units fitted with electric reactivation heaters.

| Model | ML17 | ML23 | MLT30 |
|---|---------------------|-----------|-----------|
| Process air | | | |
| Figures quoted are nominal, based on fan inlet temperature of 20°C, and an air density of 1.2 kg/m ³ | | | |
| Rated airflow (m ³ /s) | 0,472 | 0,639 | 0,833 |
| Rated airflow (m ³ /h) | 1700 | 2300 | 3000 |
| Minimum available static pressure (Pa) | 300 | 300 | 300 |
| Fan motor power (kW) | 2,0 | 3,8 | 3,8 |
| Reactivation air1 | | | |
| Rated Airflow (m ³ /s) | 0,175 | 0,236 | 0,175 |
| Rated Airflow (m ³ /h) | 630 | 850 | 630 |
| Minimum Available Static Pressure (Pa) | 300 | 300 | 300 |
| Fan motor power (kW) | 1,1 | 1,1 | 1,1 |
| Rated Current | | | |
| Current (Amps/Phase) 3~ 50 Hz 230V | 59,9 | 83,7 | 66,5 |
| Current (Amps/Phase) 3~ 60 Hz 230 V | 59,3 | 82,1 | 64,9 |
| Current (Amps/Phase) 3~ 50 Hz 380 V | 35,8 | 49,9 | 39,4 |
| Current (Amps/Phase) 3~ 60 Hz 380 V | 35,5 | 49,7 | 39,2 |
| Current (Amps/Phase) 3~ 50 Hz 400 V | 34,5 | 48,2 | 38,2 |
| Current (Amps/Phase) 3~ 50 Hz 415 V | 33,6 | 47,1 | 37,4 |
| Current (Amps/Phase) 3~ 60 Hz 440 V | 31,5 | 43,5 | 34,5 |
| Current (Amps/Phase) 3~ 60 Hz 460 V | 30,7 | 42,5 | 33,7 |
| Current (Amps/Phase) 3~ 60 Hz 480 V | 30,0 | 41,9 | 33,5 |
| Current (Amps/Phase) 3~ 50 Hz 500 V | 27,7 | 41,0 | 33,1 |
| Reactivation Heater | | | |
| Temperature rise across heater (°C) | 95 | 95 | 95 |
| Reactivation Heater Power (kW) | 18,0 | 24,6 | 18,0 |
| Other Technical Data | | | |
| Drive Motor Power (W) | 10 | 10 | 10 |
| Air Filtration (Standard) | G3 (EU3) | G3 (EU3) | G3 (EU3) |
| Electrical protection standard, dust and water resistant (main casing) | IP54 | IP54 | IP54 |
| Fan Motor Winding Insulation Class | Class F | Class F | Class F |
| Drive Motor Winding Insulation Class | Class F | Class F | Class F |
| High Temperature Cut-Out (°C) | 160 +/- 5 | 160 +/- 5 | 160 +/- 5 |
| Contactor Coil Voltage | 230 V AC | | |
| External (potential-free) output contacts | 2 A, 50 V AC (max.) | | |

Table 6.2 Technical specifications

6.8 Unit's main components

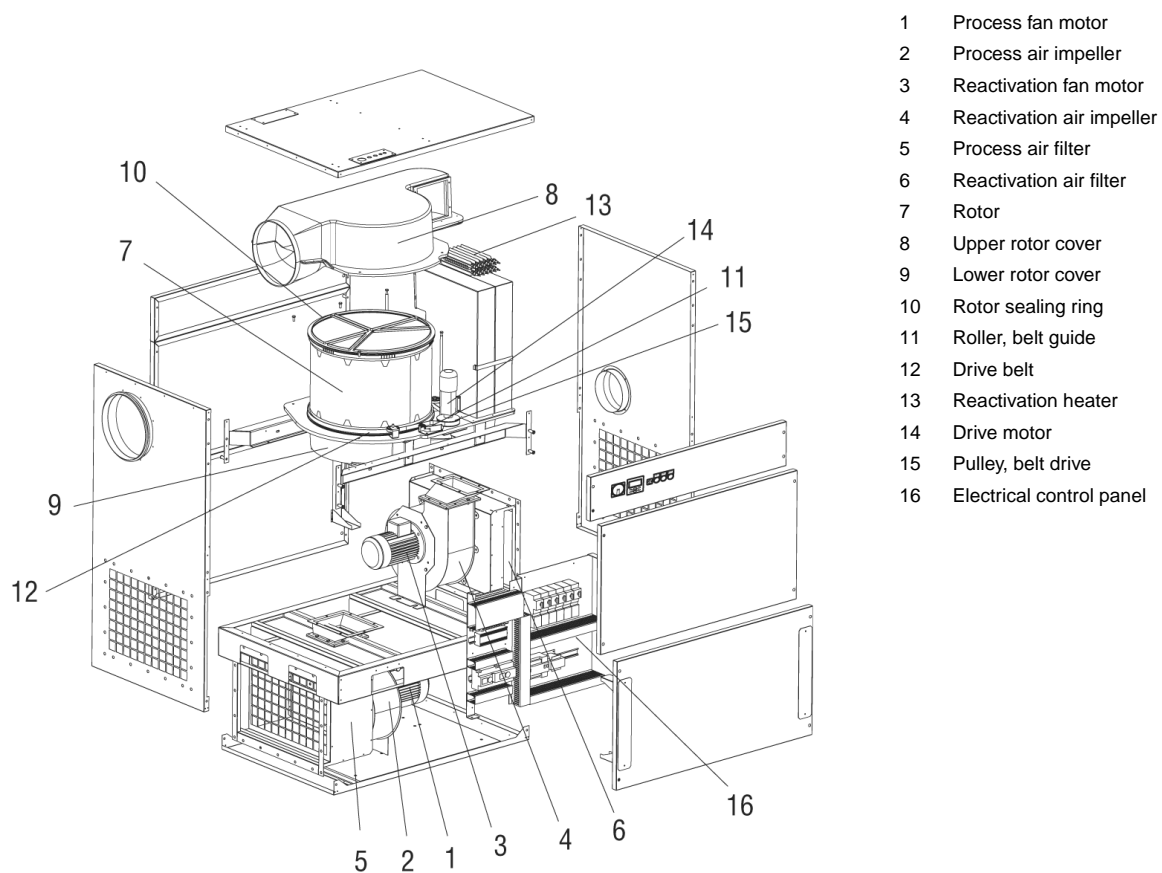


Figure 6.5 ML17 - MLT30 Layout drawing (version with electric reactivation heater)

6.9 Noise data

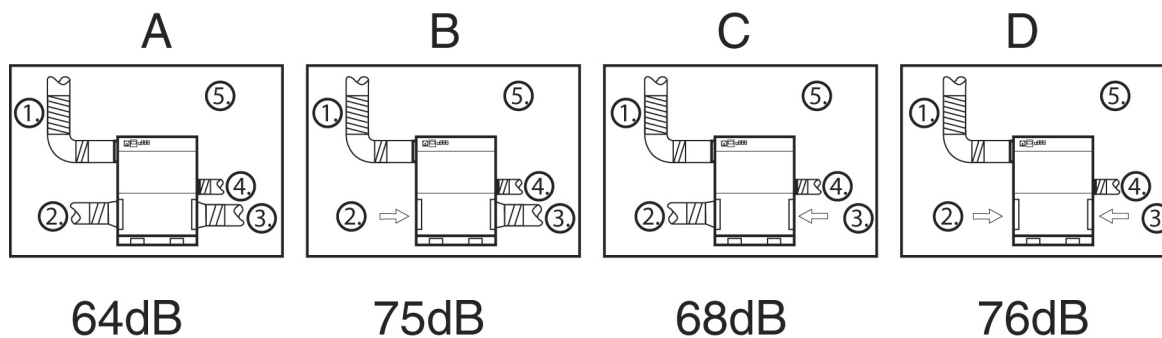
The following sound data refers to MLT30. Other sizes do not exceed these values.

| Noise for | Correction K_{ok} dB at ISO-band centre frequency, Hz | | | | | | | | | |
|-----------|---|----------|-----|-----|-----|-----|------|------|------|------|
| | dB(A) | L_{wt} | 63 | 125 | 250 | 500 | 1000 | 2000 | 4000 | 8000 |
| Duct 1 | NA | 101 | -10 | -2 | -9 | -13 | -20 | -22 | -27 | -33 |
| Duct 2 | NA | 102 | -3 | -5 | -13 | -20 | -20 | -19 | -21 | -26 |
| Duct 3 | NA | 94 | -5 | -6 | -5 | -17 | 20 | -21 | -23 | -27 |
| Duct 4 | NA | 88 | -2 | -6 | -12 | -25 | -31 | -31 | -33 | -35 |
| Room | 64 | 90 | -1 | -8 | -14 | -16 | -20 | -23 | -26 | -31 |

NOISE PATHS TO SURROUNDINGS:

- 1 Ductwork for dry air
- 2 Ductwork for process air
- 3 Ductwork for reactivation air
- 4 Ductwork for wet air

NOISE PATHS TO EQUIPMENT ROOM:



SYMBOLS:

L_{wt} = Total noise level dB (rel. 10^{-12} W)

L_w = Noise power level in octave band dB (rel. 10^{-12} W)

K_{ok} = Correction for calculating L_w ($L_w = L_{wt} + K_{ok}$)

dB(A) = Rated noise level at 100m² room absorption

7 Control system ACD

7.1 General

The dehumidifier is equipped with a programmable control system, ACD. There is a limited ability to adapt the system to meet special application needs that may arise.

The dehumidifier is delivered with the ACD system set to standard values. These can normally be adjusted on site as part of the installation and start-up process.



Figure 7.1 ACD unit

7.2 Structure

ACD is made up a number of windows for operating (no. 1-6) and basic settings (no. 10-16).

Normally, the basic setting component is only used to set basic values in conjunction with the initial start-up.

7.3 Working with the ACD



Figure 7.2 Push-button functions

Press > or < to page forward or back between the different operating windows.

Hold < depressed for three seconds to shift to the window for basic settings. Then press > or < to page forward or back between the different operating windows. Press V or Λ to change the set value.

If you cannot make your way back to the starting point, the unit must be switched off with the mode switch. Once the unit has shut down completely, switch off the main power switch and turn it on again to reset the system.

The buttons (DEL, ALT, ESC, OK) are only used for basic programming and configuration of the control system and are not to be used for normal operation.

If the "OK" button is accidentally pressed, go back by pressing "ESC."

If the "*" button is accidentally pressed, go back by pressing "*" again.

If the main power switch of the dehumidifier is in position "0", i.e. there is no power supplied, the window is dark. No settings can be made during this time.

When the dehumidifier has mains power, i.e. the main power switch is in position "1," the window is illuminated and the most recently used operating window (1-6) is displayed. A small green lamp on the right-hand side of the window flashes to confirm communication with the control system.

Illumination of the red lamp indicates a fault in the internal control network.

7.4 Operating windows (1-6)

Window for monitoring. Some settings can be made here.

Window 1, which is the base window, has three variants – 1A, 1B and 1C – depending on which humidity regulation principle is selected for the dehumidifier. The system automatically displays the window relevant to the selected type of humidity regulation.

Selection of humidity regulation principle is made in window 12; see section 7.5.3, *Window 12, Humidity control alternatives*.

7.4.1 Window 1A, Internal set-point

In most cases, this is the starting window displayed when humidity transmitter HS21 is connected; see chapter 8.

This window shows current relative humidity (%RH) and the set-point the dehumidifier is set to work toward (SETV. 1). The set-point is set in this window.

Press V or Λ to change the set value.

| | |
|------------------|----------|
| 1A --HUMIDITY -- | |
| HUMIDITY | +048% RH |
| SETV. 1 | +050% RH |

Figure 7.3 window 1A

| | |
|----------|-------------------------------------|
| HUMIDITY | actual Relative Humidity in % RH |
| SET V. 1 | Set value Relative Humidity in % RH |

7.4.2 Window 1B, External set-point

Window 1B is automatically displayed when the dehumidifier is regulated to a set-point set outside of the unit via an external signal.

This window is solely for information. No settings can be made in this window.

| | |
|------------------|-----------|
| 1 B --HUMIDITY-- | |
| HUMIDITY | +048 % RH |
| EXT.SET V | +050 % RH |

Figure 7.4 window 1B

| | |
|-----------|--|
| HUMIDITY | Actual Relative Humidity in % RH |
| EXT.SET V | External Set Value Relative Humidity in % RH |

7.4.3 Window 1C, External control

Window 1C is displayed if the dehumidifier's reactivation heater is controlled directly via an external input signal 0 - 10 V. Input signal size is displayed in 0.1 V, i.e. 3.3 V is displayed as 33. In practice, 3.3 V means that 33% of the reactivation heater power is connected.

| | |
|-------------------|---------|
| 1 C -- CONTROL -- | |
| HUMIDITY | +048%RH |
| EXTERN CONTROL | |
| Signal 0,1V | +033 |

Figure 7.5 window 1C

| | |
|------------------|---|
| HUMIDITY | Actual relative humidity in % RH |
| EXTERNAL CONTROL | Voltage of input signal in units of 0.1 V |

7.4.4 Window 1D, Extra set-point

If at certain times a higher relative humidity can be accepted, an alternative set-point can be programmed for such. The set-point is set in this window. Press **V** or **Λ** to change the set value.

The unit is then controlled by the input signal from the humidity transmitter against the alternative set value, which is called “Set Value 2” here.

Window 1D is automatically displayed when the extra set-point regulates the dehumidifier.

For further information on connecting an extra set-point, see section 2.11.3, *Humidity control alternatives*.

```

1 D --HUMIDITY --
HUMIDITY  +048% RH
SETV.2    +050% RH

```

Figure 7.6 window 1D

| | |
|----------|--------------------------------|
| HUMIDITY | Actual Relative Humidity (%RH) |
| SET V 2 | Set Value 2 |

From this window, you can only go back to the base window (window 1A - 1C) from which you came. Press button <.

7.4.5 Window 2, Runtime

The runtime of the fans and reactivation heater can be read from window 2.

The running hours remaining before the next scheduled maintenance service are also shown here, see chapter 4, *Service and Maintenance*.

This window is solely for information. No settings can be made in this window.

```

2  -- RUNTIME --
PRO.FAN  +001890 h
HEATER   +001890 h
SERVICE +001110 h

```

Figure 7.7 window 2

| | |
|---------|--|
| FANS | Fan runtime |
| HEATER | Running hours reactivation heater |
| SERVICE | Running hours remaining to next recommended maintenance service. |

7.4.6 Window 3, Reactivation temperature

A set-point for reactivation air temperature can be specified. This set-point (max. value) and current reactivation temperature can be read from this window.

```

3  -- REACT.TEMP --
R-TEMP  + 105 C
SETV.TEMP + 120

```

Figure 7.8 window 3

| | |
|------------|--|
| R-TEMP | Current reactivation temperature |
| SETV. TEMP | Set value for reactivation temperature |

The set-point is set in window 13 among basic settings; see section 7.5.4, *Window 13, Reactivation temperature*

7.4.7 Window 4, Motor status

Window 4 provides a quick overview as to whether the rotor as well as the process and reactivation fan motors are running.

"On" is denoted by "001" and "Off" by "000".

| | |
|-------------|--------------|
| 4 | -- MOTORS -- |
| PROCESS FAN | + 001 |
| REACT. FAN | + 000 |
| DRIVE MOTOR | + 000 |

Figure 7.9 window 4

| | |
|-------------|------------------------------------|
| PROCESS FAN | Process fan |
| REACT. FAN | Reactivation fan |
| DRIVE MOTOR | Drive motor for dehumidifier rotor |

7.4.8 Window 5, Reactivation power

Window 5 displays how much of the reactivation heater's total power is used at the time of reading (specified in percent).

When the gas burner is used for reactivation, it is vital to adjust the values in this window so that the min. and max. values are correct. See separate supplementary document for adjusting max. and min. values for the gas burner. See section 3.5.7-8 in the supplement.

| | |
|---------------|--------------|
| 5 | -- HEATER -- |
| HEATER EFFECT | + 067 % |

Figure 7.10 window 5

| | |
|---------------|--------------------------------------|
| HEATER EFFECT | Reactivation heater power being used |
|---------------|--------------------------------------|

7.4.9 Window 6, Alarm

Window 6 contains a number of alarm functions. Each type of alarm is represented by a specific digit.

For a description of corrective actions for each alarm, see chapter 5, *Fault Finding*.

The red lamp on the dehumidifier illuminates with a steady glow if an alarm is triggered; see section 3.5, *Control Panel*. The alarm indicator goes out automatically when the cause has been rectified.

When an A alarm is triggered, the dehumidifier stops. If a filter alarm is triggered, the dehumidifier continues working.

The dehumidifier is equipped with the following alarms

A-alarm

- 1 Excess temperature, reactivation heater
- 2 Rotor stop
- 3 Reactivation fan
- 4 Process air fan
- 5 Drive motor
- 6 Reactivation heater
- 7 For gas heater only
- 8 Frequency converter error (IP version only)
- 9 -11 Contact Munters

Service

- 1 Dirty reactivation filter
- 2 Dirty process air filter
- 3 Maintenance required

7.5 Basic settings (Windows 10-16)

Note that all settings in windows 10-16 can only be made with the mode switch in position "0".

Press > or < to page forward or back between the different operating windows.

Page between different windows as described in section 7.3, *Working with the ACD*, i.e. with buttons > or <. To access the operating windows, hold button < depressed at least 3 seconds.

If you switch to operating windows 1-6, the most recently active window is displayed.

If a window is inactive for approx. 30 seconds, the programme returns to the most recently activated operating window.

7.5.1 Window 10, Information

The program version of the ACD Program is shown here. This version number is often needed during contacts with Munters.

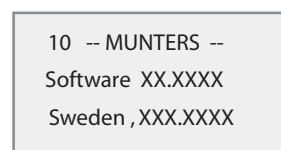


Figure 7.11 Information window

7.5.2 Window 11, Continual operation of process air fan

In certain applications, the process air fan can run continuously irrespective of whether or not dehumidifying is in progress. This will function only when the dehumidifier is in the "AUTO" mode.

Continual process air operation is set in this window. Press **V** or **Λ** to change the set value.

```

11  -- SETUP --
CONT.PRO FAN
+ 001
( 0 = NO   1 = YES )

```

Figure 7.12 window 11

If continuous process air operation is not selected, the fan will function as normal. This means that it will only work when dehumidification is needed.

| | |
|--------------|------------------------------|
| 001 | Yes, continuous operation |
| 000 (Preset) | No, not continuous operation |

7.5.3 Window 12, Humidity control alternatives

This window is used to program which type of humidity control is relevant.

A digit representing the selected type (see below) is set in the window. This setting determines which of the operating windows (1A - 1C) will be displayed in window mode 1.

```

12  -- SETUP --
HUM.CONTROL ?
(0=Int.)  +000
(1=Ext.   2=Contr)

```

Figure 7.13 window 12

| | |
|-----|---|
| 000 | Internally set set-point, set in window 1A |
| 001 | Externally set set-point, displayed in window 1B |
| 002 | External regulation of reactivation heater, see window 1C |

7.5.4 Window 13, Reactivation temperature

A maximum value for reactivation temperature can be programmed in this window (between 100°C - 140°C). Press **V** or **Λ** to change the set value.

```

13  -- SETUP --
SET VALUE R-TEMP
+120 C
( 100 - 140 )

```

Figure 7.14 window 13

7.5.5 Window 14, Control accuracy

Control accuracy, i.e. the difference (hysteresis) between activation and deactivation in automatic operating mode, is set here. Press **V** or **Λ** to change the set value.

A hysteresis value of 2 % means that the unit will start when the sensor value is 2 % (percent) above the set value and stop when the sensor value is 2 % below the set value.

Example: With a set value of 30 % and hysteresis 2%, the dehumidifier will start at 32 % and stop when the Relative Humidity (RH) of the air has dropped to 28 %.

The value can be set between 1 and 10 %.

```

14  -- SETUP --
HYSTERESIS
+/- +004 %
( 1-10 )
    
```

Figure 7.15 window 14

7.5.6 Window 15, P-gain

A value between 0 and 9 for the proportional band is set in this window.

```

15  --- SETUP ---
REGULATOR
P-GAIN +200
( 100 = 1 )
    
```

Figure 7.16 window 15

Example - to set the value 4 - press **V** or **Λ** to change the value in the window to +400 (400=4)

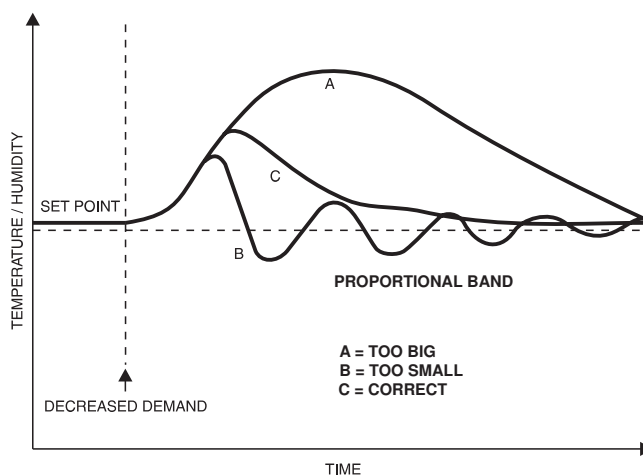


Figure 7.17 P-gain

7.5.7 Window 16, Integral time constant

An integral time constant can be programmed in this window. Time can be set between 0 and 999 seconds. Press **V** or **Λ** to change the value.

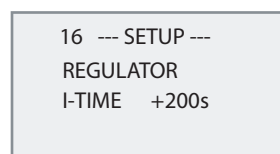


Figure 7.18 window 16

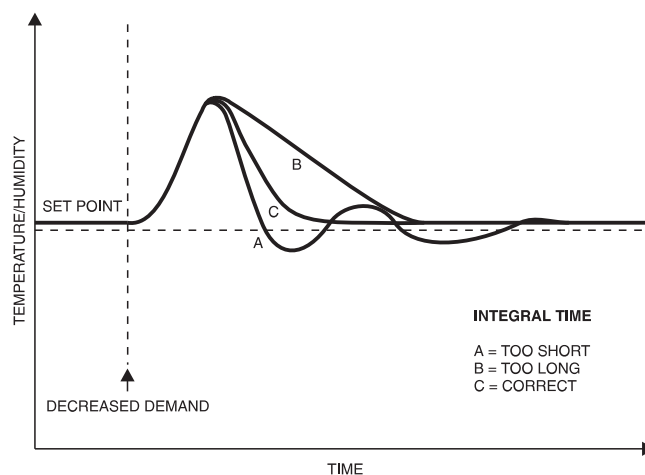


Figure 7.19 Integral time constant

...

8 HS21 Humidity transmitter

8.1 General

When an ACD control system is delivered, it comes with an HS21 humidity transmitter for fitting to a wall or duct.

The HS21 is a 2-wire indicator that is placed where the humidity of the air is to be controlled. See the instructions below for correct location.

In practice the HS21 works in a range of 0 - 99 % RH.

Every transmitter is accurately calibrated before being sent out, and so they do not require any further adjustment prior to installation.

8.2 Installation and operation

NOTE!

Never remove the dust filter from the transmitter's cover as the transmitter could easily be damaged without this protection.

8.2.1 General recommendations

The relative humidity of the air (% RH) is affected by the temperature. In order to measure the air's relative humidity accurately, the transmitter's bulb must therefore be located where the temperature is representative of the air that is to be measured.

This is why the location of the transmitter can be of crucial importance to the accuracy of the result of the measurement.

A good result can be guaranteed by following the guidelines given below.

- 1 Install the bulb where the humidity, temperature and air pressure are all representative of the environment that is to be measured.
- 2 Where a transmitter is mounted on a duct, ensure that the airflow is at least 1 m/s, so that variations in the temperature are detected quickly.
- 3 Avoid placing the transmitter in the direct vicinity of: heat sources, cooling batteries, warm or cold walls, in direct sunlight or anywhere else where the temperature is not representative.
- 4 The transmitter must be fitted with the bulb pointing downwards to prevent condensed water running into the transmitter. If this is not possible, it should be mounted horizontally.

8.3 Connecting the humidity transmitter

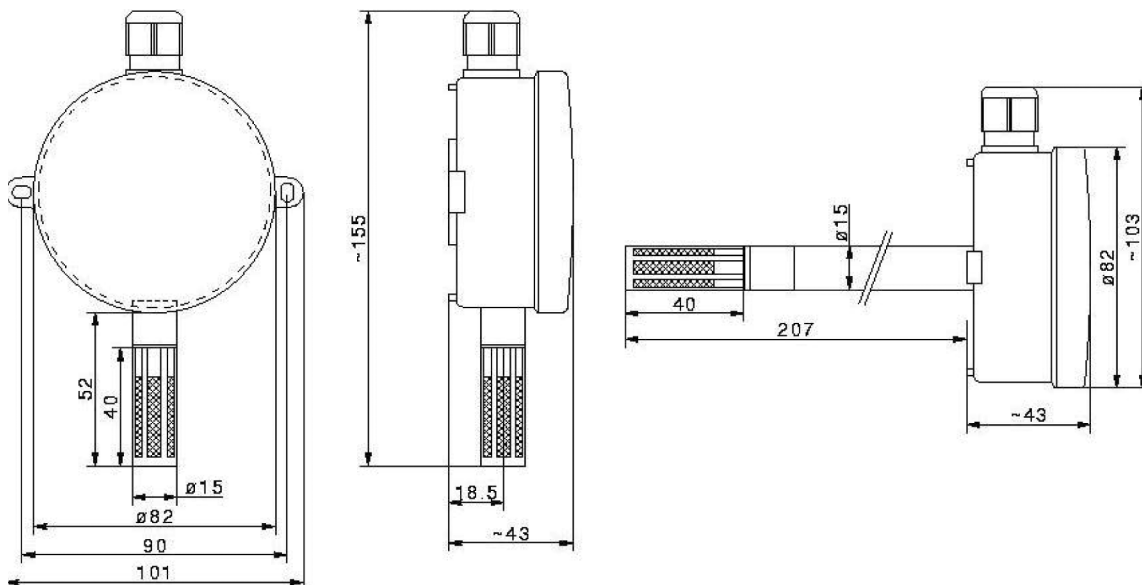
The humidity transmitter is connected to terminal blocks 301, 302 and 303, see also the accompanying electrical circuit diagram.

8.4 Maintenance

The dust filter should be cleaned at regular intervals determined by the environment in which the transmitter operates.

Clean the filter using a fine brush. If this does not clean it sufficiently, the filter must be replaced. To do this, unscrew the filter from the transmitter.

8.5 Dimensions



This page left intentionally blank

**AUSTRALIA**

Munters Pty
NORTH ALBURY
Tel: +61 (0)260 256 422
Fax: +61 (0)260 258 266

CHINA

Munters Beijing Ltd
BEIJING
Tel: +86 (0)10 80 481 121
Fax: +86 (0)10 80 483 493

GERMANY

Munters GmbH
HAMBURG
Tel: +49 40 734 16 01
Fax: +49 40 734 11 11
mgd@munters-mail.de

NETHERLANDS

Munters Vochtbeheersing
ALPHEN a/d RIJN
Tel: +31 172 43 32 31
Fax: +31 172 44 29 60
vochtbeheersing@munters.nl

SPAIN

Munters Spain SA
MADRID
Tel: +34 91 640 09 02
Fax: +34 91 640 11 32
marketing@munters.es

USA

Munters Corporation
AMESBURY
Tel: +1 978 241 1100
Fax: +1 978 241 1214

AUSTRIA

Munters Luftentfeuchtung
WIEN
Tel: +43 1 616 42 98
Fax: +43 1 616 42 98 98
info@munters.co.at

DENMARK

Munters A/S
FARUM
Tel: +45 44 95 33 55
Fax: +45 44 95 39 55
info@munters.dk

ITALY

Munters S.R.L.
ASSAGO (MI)
Tel: +39 02 488 6781
Fax: +39 02 488 1171
info@munters.it

NEW ZEALAND

Munters Pty Ltd
AUCKLAND
Tel: +64 96 34 8241
Fax: +64 96 34 8237

SWEDEN

Munters Europe AB
SOLLENTUNA
Tel: +46 8 626 6300
Fax: +46 8 754 8594
avfuktning@munters.se

www.munters.com

BELGIUM

Munters N.V.
AARTSELAAR
Tel: +32 3 458 24 34
Fax: +32 3 458 24 33
sales.info@muntersnv.be

DUBAI

Munters Middle East
DUBAI
Tel: +971 488 130 26
Fax: +971 488 131 06

JAPAN

Munters KK
TOKYO 174
Tel: +81 (0)3 5970 0021
Fax: +81 (0)3 5970 3197

POLAND

Munters Poland Sp zoo
GDANSK
Tel: +48 58 320 01 00
Fax: +48 58 320 01 19
dh@munters.pl

SWITZERLAND

Munters AG
ZÜRICH
Tel: +41 1 271 1013
Fax: +41 1 271 1019
munters.gl@gmx.ch

BRAZIL

Munters Brasil
São Paulo
Tel: +55 (0)11 505 40 150
Fax: +55 (0)11 505 40 883

FINLAND

Munters OY
HELSINKI
Tel: +358 9 8386 030
Fax: +358 9 8386 0336
info@munters.fi

KOREA

Munters
SEOUL
Tel: +82 (0)2 865 8771
Fax: +82 (0)2 865 8737

SINGAPORE

Munters Pte Ltd
SINGAPORE
Tel: +65 6744 6828
Fax: +65 6744 9585

THAILAND

Munters Co., Ltd
BANGKOK
Tel: +662 645 2708
Fax: +662 645 2710

CANADA

Munters Inc.
MISSISSAUGA
Tel: +1 905 858 5851
Fax: +1 905 858 9130

FRANCE

Munters France SAS
ARGENTEUIL
Tel: +33 1 34 11 57 57
Fax: +33 1 34 11 57 58
dh@munters.fr

MEXICO

Munters de Mexico S.A. de
C.V.
APODACA, N.L.
Tel: +52 81 8262 5400
Fax: +52 818262 5401

SOUTH AFRICA

Munters (Pty) Ltd
JOHANNESBURG
Tel: +27 (0)11 971 97 00
Fax: +27 (0)11 971 97 25

UNITED KINGDOM

Munters UK Ltd
HUNTINGDON
Tel: +44 1480 432 243
Fax: +44 1480 413 147
info@munters.co.uk